Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Silicon nanostructures grown by solid phase epitaxy PETER HADLEY, Kavli Institute, TU Delft, YANN CIVALE, DIMES, TU Delft, LIS NANVER, DIMES, TU Delft — Silicon nanocrystals can be grown by depositing amorphous silicon (a-Si) on a thin metal layer and then annealing this bilayer. The silicon diffuses through the metal and forms crystals at the metal substrate interface in a process called solid phase epitaxy (SPE). This process has been investigated for many metals (Au, Al, Pd, Ni, Cr, Fe, Co, Ti, V, Rh) and it is observed that the temperature where the significant diffusion takes place is roughly half the eutectic temperature for metals that form a eutectic composition with silicon and it is roughly half the melting temperature for the metals that form a silicide. Using this process, it is possible to deposit crystalline silicon at low temperature. In the past, uniform metal/a-Si bilayers were used. Here we describe experiments where contact windows were opened through silicon oxide before the bilayer was deposited and the metal was patterned before the annealing step. This results in the selective deposition of the silicon crystals. Devices made by this process will be described.

Peter Hadley
Kavli Institute, TU Delft

Date submitted: 30 Nov 2005 Electronic form version 1.4